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FLOOD INSURANCE STUDY

CITY OF BARTLETT, TENNESSEE
SHELBY COUNTY

DECEMBER 15, 1980

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federal emergency management agency
federal insurance administration

COMMUNITY NUMBER - 470175

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TABLE OF CONTENTS

		Page
1.0	INTRODUCTION	1
1.1	Purpose of Study	1
1.2	Authority and Acknowledgments	1
1.3	Coordination	1
2.0	AREA STUDIED	2
2.1	Scope of Study	2
2.2	Community Description	2
2.3	Principal Flood Problems	4
2.4	Flood Protection Measures	6
3.0	ENGINEERING METHODS	6
3.1	Hydrologic Analyses	9
3.2	Hydraulic Analyses	10
4.0	FLOOD PLAIN MANAGEMENT APPLICATIONS	11
4.1	Flood Boundaries	11
4.2	Floodways	12
5.0	INSURANCE APPLICATION	19
5.1	Reach Determinations	20
5.2	Flood Hazard Factors	20
5.3	Flood Insurance Zones	20
5.4	Flood Insurance Rate Map Description	21

TABLE OF CONTENTS - continued

		Page
6.0	OTHER STUDIES	21
7.0	LOCATION OF DATA	24
8.0	BIBLIOGRAPHY AND REFERENCES	24

FIGURES

Figure 1 -	Vicinity Map	3
Figure 2 -	Floodwaters of Harrington Creek near Blackwell Street, 12 March 1975	7
Figure 3 -	Floodwaters of recently channelized portion of Harrington Creek upstream of Bartlett Road, 12 March 1975	7
Figure 4 -	Floodwaters of Harrington Creek on High Street, 12 March 1975	8
Figure 5 -	Floodwaters of Harrington Creek upstream of Raleigh LaGrange Road, 12 March 1975	8
Figure 6 -	Floodway Schematic	19

TABLES

Table 1 -	Summary of Discharges	9-10
Table 2 -	Floodway Data	13-18
Table 3 -	Flood Insurance Zone Data	22-23

EXHIBITS

Exhibit 1 -	Flood Profiles	
	Harrington Creek	Panel 01P
	Lateral A.	Panel 02P

TABLE OF CONTENTS- continued

EXHIBITS--continued

Exhibit 1 - Flood Profiles - Continued

Lateral B	Panel 03P
Lateral C	Panel 04P
Lateral D	Panel 05P
Lateral E	Panel 06P

Exhibit 2 - Flood Boundary and Floodway Map

PUBLISHED SEPARATELY:

Flood Insurance Rate Map

FLOOD INSURANCE STUDY
CITY OF BARTLETT, TENNESSEE

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study investigates the existence and severity of flood hazards in The City of Bartlett, Shelby County, Tennessee, and aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This study will be used to convert Bartlett to the regular program of flood insurance by the Federal Insurance Administration (FIA). Local and regional planners will use this study in their efforts to promote sound flood plain management.

In some states or communities, flood plain management criteria or regulations may exist that are more restrictive or comprehensive than those on which these Federally-supported studies are based. These criteria take precedence over the minimum Federal criteria for purposes of regulating development in the flood plain, as set forth in the Code of Federal Regulations at 24 CFR, 1910.1 (d). In such cases, however, it shall be understood that the state (or other jurisdictional agency) shall be able to explain these requirements and criteria.

1.2 Authority and Acknowledgments

The source of authority for this Flood Insurance Study is the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

The hydrologic and hydraulic analyses for this study were performed by the U.S. Army Corps of Engineers, Memphis District, for the Federal Insurance Administration, under Inter-Agency Agreement No. (IAA) H-7-76, Project Order No. 12. This study was completed in June 1979.

1.3 Coordination

Community base map selection and the identification of streams requiring detailed study were made in a meeting attended by personnel of the U.S. Army Corps of Engineers (COE), the FIA and Bartlett city officials in April 1975. A public notice announcing the intent to perform a flood elevation study was published in "The Commercial Appeal" on the 8th, 15th, and 22nd of April 1976 and "The Daily News" on the 16th, 23rd and 30th of April 1976. This notice asked the public to bring any relevant facts and technical data concerning local flood hazards to the community Chief Executive Officer.

Letters were sent to various State, Federal, and private agencies informing them of the forthcoming insurance study and requesting any pertinent information available. Field interviews with local residents were conducted to help define flood hazard areas within Bartlett, and validate theoretical analysis. On February 4, 1980, the results of the work performed by the COE were presented to the FIA and Bartlett City officials at a final coordination meeting.

2.0 AREA STUDIED

2.1 Scope of Study

This Flood Insurance Study covers the incorporated area of the City of Bartlett, Tennessee, and some selected stream reaches outside the corporate limits as determined by FIA representatives and city officials. The area of study is shown on the Vicinity Map (Figure 1). The entire area was studied in detail and includes Harrington Creek, Lateral A, B, C, D and E. In selecting streams to be studied in detail, consideration was given to expected development through 1984.

2.2 Community Description

The City of Bartlett is located in the upper portion of Harrington Creek drainage basin in Shelby County. It is on the northeast side of Memphis, Tennessee, with Memphis and Bartlett having common boundaries on the south and west side of Bartlett. Downtown Memphis is approximately 12 miles from Bartlett.

Bartlett originated during the reconstruction period after the Civil War. It was orginally known as Union Station, the second depot stop from Memphis for the Louisville and Nashville Railroad. In 1866, the town was incorporated and named after Major Gabriel M. Bartlett, one of the pioneer settlers in the area.

Bartlett grew steadily during the reconstruction period, and by 1870 had a courthouse, two private day schools, a post office, five general stores, two grist mills with gins attached, and three churches. The city had become known as an educational center and an agricultural community.

The forthcoming years brought little growth for Bartlett until 1951 when a central water system was installed. The completion of this system spurred a residential growth boom. The population sprang from 497 in 1960 to 1,725 in 1970. The present 1979 estimate is 15,000. This unusual growth, confined within a 9 square mile corporate area, has brought the flood plains of Bartlett under heavy development pressure.

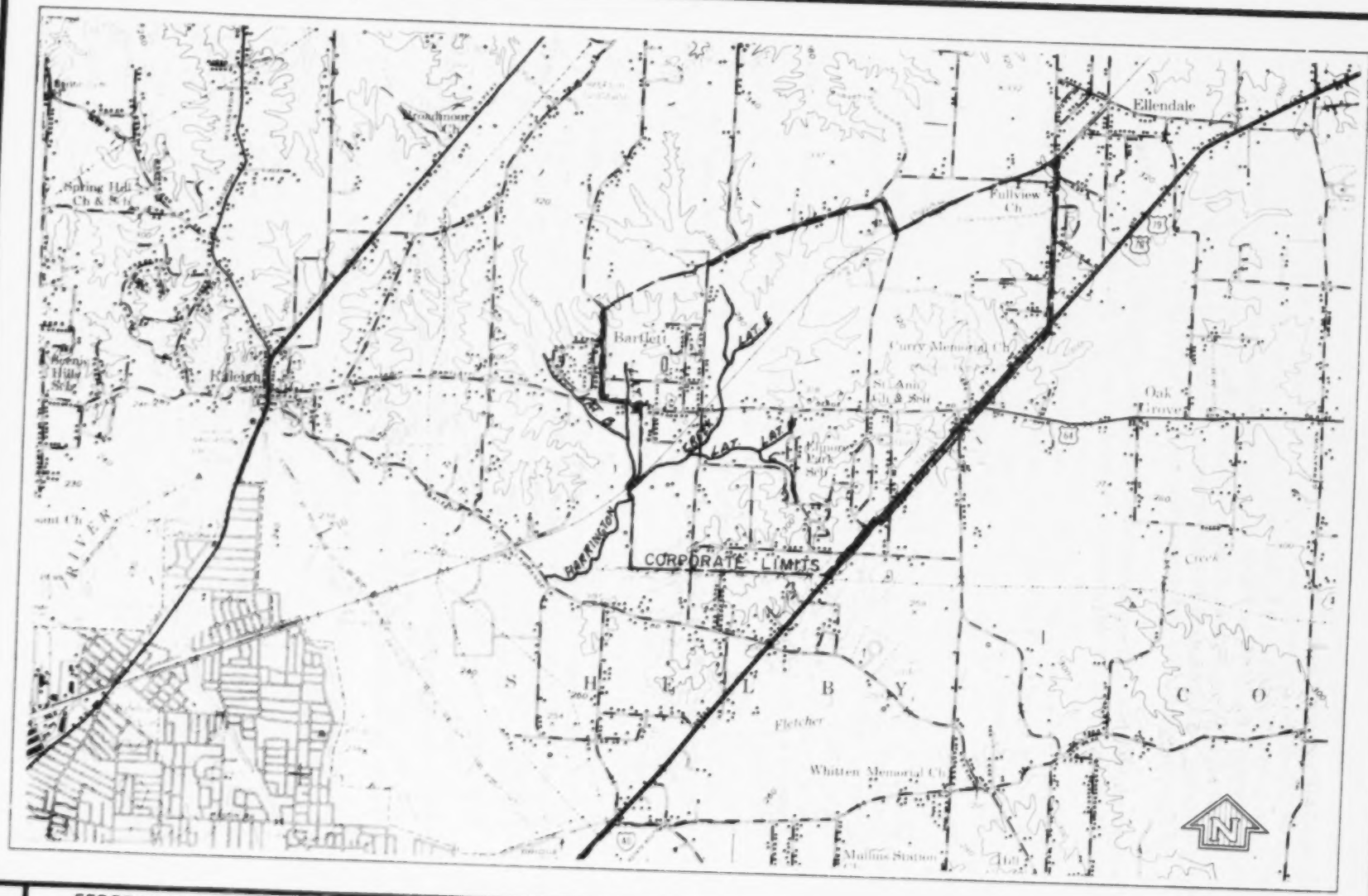


FIGURE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

CITY OF BARTLETT, TN
(SHELBY CO.)

APPROXIMATE SCALE

1 0 1 2 3 MILES

VICINITY MAP

Most of the area in the Harrington Creek flood plain is developed. The area above the Louisville and Nashville Railroad is residential. The flood plain below the railroad to Bartlett Road is commercial development. A park has been built in the flood plain between Bartlett Road and mile 3.0 on Harrington Creek. The remainder of the flood plain inside the corporate limits has some residential development, but the land immediately outside of Bartlett is mostly undeveloped.

Lateral A is completely undeveloped from its mouth to the confluence of Lateral B. From this point to the study limits is residential.

Laterals B, C, and D are mostly residential with very little undeveloped land. The flood plain of Lateral E has just recently been developed for residential use.

2.3 Principal Flood Problems

Damaging floods have been reported to have occurred in the Bartlett area in the past. Some of the more recent floods causing significant damage occurred in 1972 and 1973. There is not enough information available for these floods to assign a flood frequency.

There are no official rainfall reporting stations within the Harrington Creek Drainage Basin. However, rainfall records for the Memphis area are available from 1871 to the present. During this period of record, the maximum rainfall in a 24-hour period at the Memphis rainfall station was recorded to be 10.48 inches occurring on 20-21 November 1934. This rainfall exceeded the 100-year frequency total rainfall for a 24-hour period. Some of the more recent 24-hour rainfalls as recorded at the station are as follows: 3.23 inches on 4 August 1978, 4.92 inches on 12 March 1975, 4.94 inches on 8-9 May 1958, 4.63 inches on 21-22 September 1957, and 4.15 inches on 2-3 December 1964. A rainfall of 2.6 inches in a 24-hour period on 22 August 1972, produced considerable flooding in Bartlett. This rainfall had a peak one-hour intensity of 2.4 inches. On 30 July 1973, a flood producing rainfall of 2 inches in 2 hours was reported by the Sinclair Service Station in Bartlett.

The following excerpts taken from the Commercial Appeal (Memphis, Tennessee) and the Raleigh-Bartlett Star (Millington, Tennessee) are descriptions of known floods that have occurred in Bartlett, Tennessee.

EXCERPTS FROM THE RALEIGH-BARTLETT STAR

Friday - 3 August 1973

Raleigh and Bartlett Hit by Flash Floods

"Heavy rains brought flash flooding to Raleigh-Bartlett Monday afternoon, and the area around Stage Road and Stage Coach Drive was especially hard hit.

"A thunderstorm pelted the area for two hours stopping traffic on Stage Road, and washing away furniture, garbage cans, and in some cases, cars. Two hours after the rain stopped, the water was still better than three feet deep in an apartment complex on Stage Park Place.

"For residents of the area, the flood brought what is almost becoming a common scene. Carpets, hardwood floors, lawnmowers and automobile interiors were soaked and ruined again, and homeowners faced another tough clean-up job.

" 'I'm moving,' said Carl Rodgers of 5367 Virgil Road. 'I've had it here and I wouldn't unload this house on anyone who doen't know about it. Water has been in the house four times since Easter. I can't afford it anymore. It costs $200 just to get the rugs dried out everytime it rains.'

"According to County Engineer George Dando, much of the flooding is do to construction debris which clogs inlets and prohibits normal run-off.

" 'Lots of this flooding, though, was just from the excessive amount of rainfalls,' he commented, 'and we are just not equipped properly in these areas to deal with it.'

"Rodgers however disagrees with Dando, and blames the floods on rapid development, which has replaced grass and trees with houses and concrete. Mrs. Shirley Williams of 2860 Stage Park Place was not very happy about the flood either.

" 'Every time it rains we get lakefront property, 'she said. 'It takes only about two or three hours of rain to do this. It happened about 4 a.m. once and the man down the street woke up to see his daughter's Volkswagon floating off. The car was ruined.' "

EXCERPTS FROM THE COMMERCIAL APPEAL

Wednesday - 23 August 1972

Rain Floods Homes, Knocks Out Power

"A line of thunderstorms crossed the city in the early evening hours yesterday and left flooded homes, utility outages, and a flurry of minor automobile accidents.

"More than a half-inch of rain fell in a three-hour period as the storm concentrated on the northern half of the county and apparently did its heaviest damage in the Raleigh-Bartlett area.

"Sheriff's deputies and Memphis Light, Gas & Water Division reported numerous appeals for help along flooded streets, but said there were apparently no storm-related injuries."

"On Alfaree in Bartlett, two homes were flooded and the contents damaged.

" 'They get it just about every year,' said one of the owners. He asked that his name not be used because he and others are trying to sell their houses, but added: 'There's a drainage ditch right behind the houses and it hasn't been cleaned. The water backs right up into the houses. We got about three feet in our house.'

"Many homes along other streets in the hilly area were similarly damaged, owners reported. Thomas Road was reported washed out near Rappahannock."

Bartlett's flood problem is due mainly to increased development along the flood plain which increases run-off. The flood problem has been reduced by the recent channelization.

With more development and more encroachment onto the flood plain the flood problem will increase.

Figures 2 through 5 show flood waters in various locations in the study area.

2.4 Flood Protection Measures

The City of Bartlett has enlarged and realigned Harrington Creek from just above North Street to the southern corporate limits except for a short reach between the Louisville and Nashville Railroad and just south of Blackwell.

Lateral A has been enlarged and concrete lined from Stage Road to the confluence of Lateral B. The city is also planning to install a larger culvert in Lateral B under Stage Road.

Lateral E has been cleaned out from Sycamore View to the study limits in connection with the recent residential development.

3.0 ENGINEERING METHODS

For the flooding sources studied in detail in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Flood events of a magnitude which are expected to be equalled or exceeded once on the average during any 10-, 50-, 100-, and 500-year period (recurrence intervals), have been selected as having special significance for flood plain management and for flood insurance premium rates. These events, commonly termed the 10-, 50-, 100-, and 500-year floods, have a 10, 2, 1, and 0.2 percent chance, respectively, of being equalled or exceeded during any year.

FIGURE 2: Floodwaters of Harrington Creek near Blackwell Street, 12 March 1975.

FIGURE 3: Floodwaters of recently channelized portion of Harrington Creek upstream of Bartlett Road, 12 March 1975.

FIGURE 4: Floodwaters of Harrington Creek on High Street, 12 March 1975.

FIGURE 5: Floodwaters of Harrington Creek upstream of Raleigh LaGrange Road, 12 March 1975.

Although the recurrence interval represents the long term, average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than one year are considered. For example, the risk of having a flood which equals or exceeds the 100-year flood (one percent chance of annual occurrence) in any 50 year period is about 40 percent (four in 10), and for any 90 year period, the risk increases to about 60 percent (six in 10). The analyses reported here reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

3.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish peak discharge-frequency relationships for floods of the selected recurrence intervals for each flooding source studied in detail in the community.

Harrington Creek basin was divided into sub-areas, and unit hydrographs were developed using the Soil Conservation Service's method as described in the Soil Conservation Service's National Engineering Handbook (Reference 1). Rainfall frequency values were determined from the U.S. National Weather Service's Technical Paper No. 40 for the 10-, 50- and 100-year frequency rainfalls (Reference 2). A corresponding 500-year frequency rainfall was determined by extrapolating the 10-, 50-, and 100-year frequency rainfall amount for given durations. Rainfall losses for each sub-area were based on Soil Conservation Service's land use and runoff curves. The rainfall excess was applied to each unit hydrograph to obtain the flood hydrograph for each area. The flood hydrographs were combined and routed by the modified Puls method.

The peak discharge-drainage area relationships for the selected recurrence intervals are presented in Table 1, "Summary of Discharges."

TABLE 1 - SUMMARY OF DISCHARGES

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (cfs) 10-YEAR	50-YEAR	100-YEAR	500-YEAR
HARRINGTON CREEK					
Raleigh-LaGrange	9.5	3,371	3,830	3,982	4,312
Stage Road	5.9	2,454	2,869	3,060	3,611
North Street	4.0	1,559	1,963	2,118	2,431
LATERAL A					
Confluence with Harrington Creek	1.9	1,054	1,321	1,415	1,593
Stage Road	0.4	848	1,108	1,211	1,420

TABLE 1- SUMMARY OF DISCHARGES - continued

LATERAL B					
Confluence with Lateral A	1.1	925	1,208	1,320	1,547
LATERAL C					
Confluence with Harrington Creek	1.0	729	937	1,019	1,168
LATERAL D					
Confluence with Lateral C	0.5	576	750	819	959
LATERAL E					
Confluence with Harrington Creek	1.7	1,028	1,382	1,522	1,825

3.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of the flooding sources studied in detail in the community were carried out to provide estimates of the elevations of floods of the selected recurrence intervals along each of the flood sources.

Aerial photographs of the Bartlett area were flown in January 1976. Cross section data and spot elevations within the flood plains of the streams were obtained by field surveys during September 1974. This survey information was updated to show the new channel improvements that have been made in recent years. All bridges and culverts were surveyed to obtain elevation data and structural geometry. Section locations shown on the Flood Boundary and Floodway Map (Exhibit 2) are the location of the valley sections. For each road crossing, a roadway section was also taken along the centerline of the road. These sections were extended across the flood plain using topographic map data where necessary for the hydraulic analysis.

Manning's roughness coefficients were estimated by field inspection and ranged from 0.05 to 0.10 for earth channels and from 0.04 to 0.07 for overbank areas. Starting water-surface elevations were obtained by concurrent studies by the COE (Reference 3).

Water surface profiles were developed using computer program HEC-2, "Water-Surface Profiles" (Reference 4). This program uses the backwater standard step method for natural channels and contains elaborate routines for evaluating head losses at bridges and culverts.

Flood profiles were drawn showing computed watersurface elevations for floods of the selected recurrence intervals (Exhibit 1). The resulting flood boundaries and floodway limits, along with locations of cross sections, are shown on the Flood Boundary and Floodway Map (Exhibit 2). All elevations are measured from National Geodetic Vertical Datum of 1929 (NGVD).

Elevation reference mark data, including both existing bench marks and other significant elevation reference marks developed during the study, are shown on the maps.

The hydraulic analyses for this study were based on unobstructed flow. The flood elevations shown on the profiles are this considered valid only if hydraulic structures remain unobstructed, operate properly, and do not fail.

4.0 FLOOD PLAIN MANAGEMENT APPLICATIONS

The National Flood Insurance Program encourages state and local governments to adopt sound flood plain management programs. Therefore, each Flood Insurance Study includes a flood boundary map designed to assist communities in developing sound flood plain management measures.

4.1 Flood Boundaries

In order to provide a national standard without regional discrimination, the 100-year flood has been adopted by the FIA as the base flood for purposes of flood plain management measures. The 500-year flood is employed to indicate additional areas of flood risk in the community. For each stream studied in detail, the boundaries of the 100- and the 500-year floods have been delineated using the flood elevations determined at each cross section; between cross sections, the boundaries were interpolated using a topographic map at a scale of 1: 12,000 with a contour interval of 10 feet. This map was developed using 1:24,000 U.S.G.S. quadrangle maps with a contour interval of 10 feet (Reference 5). These contours were adjusted and added where necessary to obtain agreement with the field surveyed cross sections and spot elevations.

Small areas within the flood boundaries may lie above the flood elevations: and, therefore, may not be subject to flooding. Owing to limitations of the map scale and/or topographical data such areas are not always shown. Also, along the outer limit of the flood boundaries, delineation of the flood outlines may be in slight error due to the accuracy of the topographic data. Where the 500-year and 100-year flood boundaries coincide, only the 100-year boundary is shown. Both the Flood Insurance Rate Map (published seperately) and the Flood Boundary and Floodway Map (Exhibit 2), show the location of the elevation reference marks. The elevation data of these reference marks along with the expected flood elevation can be used to determine if a specific site is subject to flooding.

4.2 Floodways

Encroachment on flood plains, such as artificial fill, reduces the flood-carrying capacity, increases the flood heights of streams, and increases flood hazards in areas beyond the encroachment itself. One aspect of flood plain management involves balancing the economic gain from flood plain development against the resulting increase in flood hazard. For purposes of the National Flood Insurance Program, the concept of a floodway is used as a tool to assist local communities in this aspect of flood plain management. Under this concept, the area of the 100-year flood is divided into a floodway and a floodway fringe. The floodway is the channel of a stream plus any adjacent flood plain areas that must be kept free of encroachment in order that the 100-year flood may be carried without substantial increases in flood heights. Minimum standards of the FIA limit such increases in flood heights to 1.0 foot, provided that hazardous velocities are not produced. The floodways in this report are presented to local agencies as minimum standards that can be adopted or that can be used as a basis for additional studies.

The floodways proposed for this study were computed on the basis of equal conveyance reduction from each side of the flood plain. Floodway widths were chosen to minimize the amount of land area required for passage of the 100-year flood flow. The results of these computations are shown in Table 2.

As shown on the Flood Boundary and Floodway Map (Exhibit 2), the floodway boundaries were determined at cross sections; between cross sections the boundaries were interpolated. In cases where the floodway boundaries and 100-year boundaries coincide only the floodway boundary is shown.

The area between the floodway and the boundary of the 100-year flood is termed the floodway fringe. The floodway fringe thus encompasses the portion of the flood plain that could be completely obstructed without increasing the water-surface elevation of the 100-year flood more than 1.0 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to flood plain development are shown in Figure 6.

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FT.)	SECTION AREA (SQ. FT.)	MEAN VELOCITY (F.P.S.)	REGULATORY (NGVD)	WITHOUT FLOODWAY (NGVD)	WITH FLOODWAY (NGVD)	INCREASE (FEET)
Harrington Creek								
A	2.68	360/120[2]	1,860	2.1	251.5	251.5	252.5	1.0
B	2.77	100	910	4.4	251.7	251.7	252.7	1.0
C	2.92	100	984	4.9	252.4	252.4	253.4	1.0
D	3.08	100	892	4.2	252.8	252.8	253.8	1.0
E	3.13	90	738	5.1	253.7	253.7	254.5	0.8
F	3.27	90	682	5.5	254.9	254.9	255.4	0.5
G	3.49	90	652	4.7	257.3	257.3	258.3	1.0
H	3.71	90	662	4.6	259.2	259.2	259.7	0.5
I	3.82	90	673	4.6	260.4	260.4	260.8	0.4
J	3.90	90	628	4.9	260.9	260.9	261.2	0.3
K	4.10	180	454	7.8	263.8	263.8	264.8	1.0
L	4.43	90	506	4.2	267.6	267.6	268.6	1.0
M	4.67	300	614	4.5	273.0	273.0	273.2	0.2

[1]Miles above mouth

[2]Width/width within corporate limits

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

CITY OF BARTLETT, TN

(SHELBY CO.)

FLOODWAY DATA

HARRINGTON CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FT.)	SECTION AREA (SQ. FT.)	MEAN VELOCITY (F.P.S.)	REGULATORY (NGVD)	WITHOUT FLOODWAY (NGVD)	WITH FLOODWAY (NGVD)	INCREASE (FEET)
Lateral A								
A	0.03	80	523	2.7	251.5	251.5	252.5	1.0
B	0.39	790	2,782	0.5	255.2	255.2	256.0	0.8
C	0.55	190	660	1.8	257.4	257.4	258.4	1.0
D	0.82	50	236	5.1	264.7	264.7	265.5	0.8
E	1.01	260	1,503	0.8	269.0	269.0	269.3	0.3
F	1.19	60	220	5.7	269.7	269.7	270.4	0.7

[1]Miles above mouth

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

CITY OF BARTLETT, TN
(SHELBY CO.)

FLOODWAY DATA

LATERAL A

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FT.)	SECTION AREA (SQ. FT.)	MEAN VELOCITY (F.P.S.)	REGULATORY (NGVD)	WITHOUT FLOODWAY (NGVD)	WITH FLOODWAY (NGVD)	INCREASE (FEET)
Lateral B								
A	0.03	250	571	2.3	257.7	256.9[3]	257.8	0.9
B[2]	0.28	140	421	3.1	261.4	261.4	262.2	0.8
C	0.50	40	371	3.6	266.2	266.2	267.1	0.9
D	0.71	30	142	8.0	267.6	267.6	268.4	0.8
E	0.87	100	449	2.5	270.7	270.7	271.5	0.8

[1] Miles above mouth
[2] Cross section outside of corporate limits
[3] Elevation computed without considering backwater effects from Lateral A

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

CITY OF BARTLETT, TN

(SHELBY CO.)

FLOODWAY DATA

LATERAL B

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FT.)	SECTION AREA (SQ. FT.)	MEAN VELOCITY (F.P.S.)	REGULATORY (NGVD)	WITHOUT FLOODWAY (NGVD)	WITH FLOODWAY (NGVD)	INCREASE (FEET)
Lateral C								
A	0.10	30	139	7.4	257.0	257.0	258.0	1.0
B	0.24	90	334	3.1	260.3	260.3	261.2	0.9
C	0.44	40	225	6.8	263.1	263.1	264.1	1.0
D	0.57	40	189	4.0	264.9	264.9	265.9	1.0
E	0.74	30	118	6.4	271.6	271.6	272.6	1.0
F	0.87	170	225	3.4	276.1	276.1	277.1	1.0
G	1.00	60	206	2.5	280.4	280.4	281.4	1.0

[1]Miles above mouth

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

CITY OF BARTLETT, TN

(SHELBY CO.)

FLOODWAY DATA

LATERAL C

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FT.)	SECTION AREA (SQ. FT.)	MEAN VELOCITY (F.P.S.)	REGULATORY (NGVD)	WITHOUT FLOODWAY (NGVD)	WITH FLOODWAY (NGVD)	INCREASE (FEET)
Lateral D								
A	0.18	50	202	4.1	268.3	268.3	269.3	1.0
B	0.28	20	154	5.3	272.7	272.7	273.7	1.0

[1]Miles above mouth

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

CITY OF BARTLETT, TN
(SHELBY CO.)

FLOODWAY DATA

LATERAL D

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FT.)	SECTION AREA (SQ. FT.)	MEAN VELOCITY (F.P.S.)	REGULATORY (NGVD)	WITHOUT FLOODWAY (NGVD)	WITH FLOODWAY (NGVD)	INCREASE (FEET)
Lateral E								
A	0.06	120	332	4.6	263.8	263.1[2]	264.1	1.0
B	0.36	330	1,322	1.2	269.9	269.9	270.3	0.4
C	0.51	60	343	4.5	270.0	270.0	270.5	0.5

[1]Miles above mouth
[2]Elevations computed without consideration of backwater effects from Harrington Creek

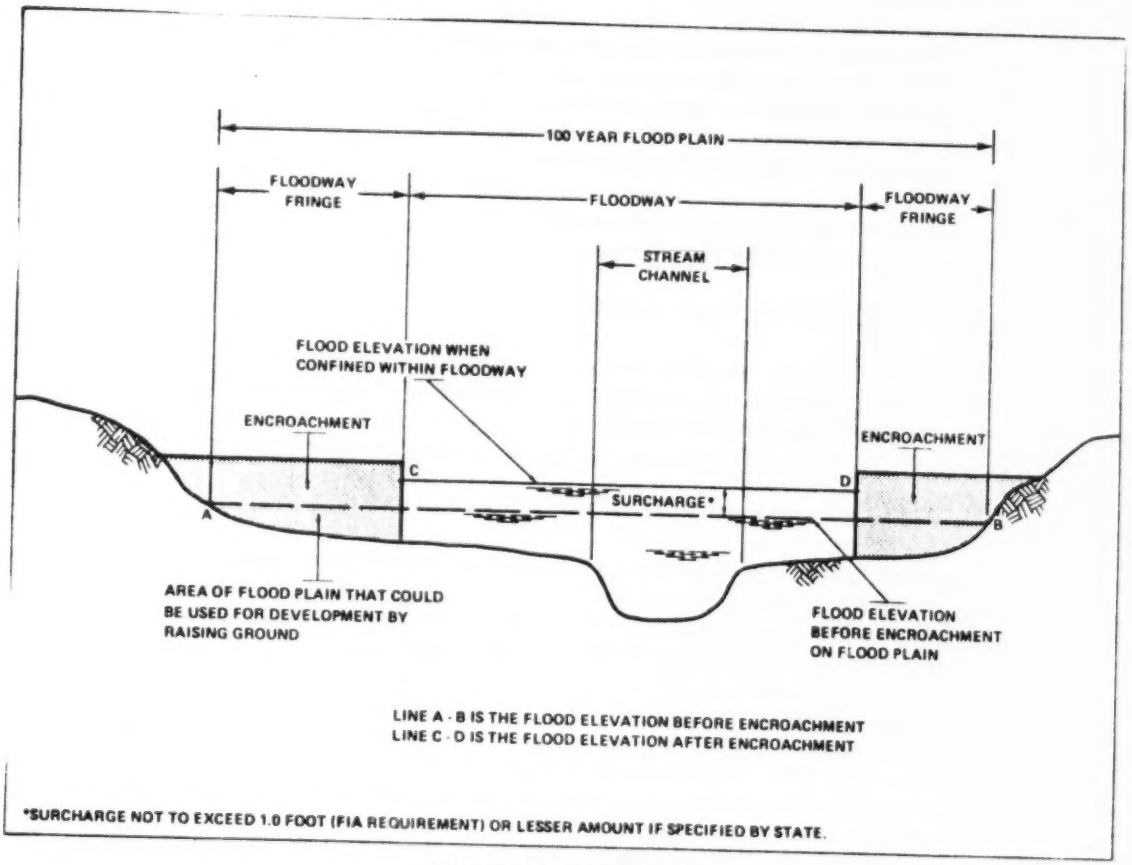
TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

CITY OF BARTLETT, TN
(SHELBY CO.)

FLOODWAY DATA

LATERAL E


100 YEAR FLOOD PLAIN
FLOODWAY FRINGE
FLOODWAY
FLOODWAY FRINGE
STREAM CHANNEL
FLOOD ELEVATION WHEN CONFINED WITHIN FLOODWAY
ENCROACHMENT
ENCROACHMENT
C
D
A
B
SURCHARGE*
AREA OF FLOOD PLAIN THAT COULD BE USED FOR DEVELOPMENT BY RAISING GROUND
FLOOD ELEVATION BEFORE ENCROACHMENT ON FLOOD PLAIN
LINE A - B IS THE FLOOD ELEVATION BEFORE ENCROACHMENT
LINE C - D IS THE FLOOD ELEVATION AFTER ENCROACHMENT
*SURCHARGE NOT TO EXCEED 1.0 FOOT (FIA REQUIREMENT) OR LESSER AMOUNT IF SPECIFIED BY STATE.

FLOODWAY SCHEMATIC

Figure 6

5.0 INSURANCE APPLICATION

In order to establish actuarial insurance rates, the FIA has developed a process to transform the data from the engineering study into flood insurance criteria. This process includes the determination of reaches, Flood Hazard Factors (FHFs), and flood insurance zone designations for each significant flooding source affecting the City of Bartlett.

5.1 Reach Determinations

Reaches are defined as lengths of watercourses having relatively the same flood hazard, based on the average weighted difference in water-surface elevations between the 10- and 100-year floods. This difference does not have a variation greater than that indicated in the following table for more than 20 percent of the reach.

Average Difference Between 10- and 100-Year Floods	Variation
Less than 2 feet	0.5 foot

Eight reaches meeting the above criteria were required for the flooding sources of Bartlett. The locations of the reaches are shown on the Flood Profiles (Exhibit 1).

5.2 Flood Hazard Factors (FHFs)

The Flood Hazard Factor is used to correlate flood information with insurance rate tables. Correlations between property damages from floods and their assigned FHFs are used to set actuarial insurance premium rate tables based on FHFs from 005 to 200.

The FHF for a reach is the average weighted difference between the 10- and 100-year flood water-surface elevations expressed to the nearest one-half foot, and shown as a three-digit code. For example, if the difference between the water-surface elevations of the 10- and 100-year floods is 0.7 foot, the FHF is 005; if the difference is 1.4 feet, the FHF is 015; if the difference is 5.0 feet, the FHF is 050. When the difference between the 10- and 100-year flood water-surface elevations is greater than 10.0 feet, the accuracy for the FHF is to the nearest foot.

5.3 Flood Insurance Zones

After the determination of reaches and their respective FHFs, the study area was divided into zones, each having a specific flood potential or hazard. Each zone was assigned one of the following flood insurance zone designations.

Zones A1, A2, A3, A4, and A5: Special flood hazard areas inundated by the 100-year flood with base flood elevations determined and zone designations assigned according to FHF.

Zone B: Areas between the Special Flood Hazard Area and the limits of the 500-year flood, including areas of the 500-year flood plain that are protected from the 100-year flood by dike, levee, or other water control structure; areas subject to certain types of 100-year shallow flooding where depths are less than 1.0 foot; or areas subject to 100-year flooding from sources with drainage areas less than 1 square mile. Zone B is not subdivided.

Zone C: Area not subject to flooding by the 500-year flood.

Table 3, "Flood Insurance Zone Data," summarizes the flood elevation differences, FHFs, flood insurance zones, and base flood elevations for each flooding source studied in detail in the community.

5.4 Flood Insurance Rate Map Description

The Flood Insurance Rate Map for the City of Bartlett is, for insurance purposes, the principal result of the Flood Insurance Study. This map (published separately) contains the official delineation of flood insurance zones and base flood elevation lines. Base flood elevation lines show the locations of the expected whole-foot water-surface elevations of the base (100-year) flood. This map is developed in accordance with the latest flood insurance map preparation guidelines published by the FIA.

6.0 OTHER STUDIES

The Flood Insurance Study was made in conjuction with the Wolf River Basin Study. A Flood Plain Information Report was done on Harrington Creek and Tributaries by the Memphis District in March 1976. The flood elevations differ in this report from the Flood Plain Information Report because of the new channel alignment and enlargement and increased urbanization.

The Department of Housing and Urban Development, Federal Insurance Administration, issued a Flood Hazard Boundary Map for the City of Bartlett in February 1974, as the result of an approximate flood hazard study. Plate 1 of these maps was revised in June 1977 (Reference 6). That approximate study is to be superseded by the results of this detailed flood hazard study. This detailed study supports some of the approximate flood hazard areas mapped, but contradicts others.

FLOODING SOURCE	PANEL[1]	ELEVATION DIFFERENCE[2] BETWEEN 1.0% (100-YEAR) FLOOD AND			FHF	ZONE	BASE FLOOD ELEVATION[3] (NGVD)
		10% (10 YR.)	2% (50 YR.)	0.2% (500 YR.)			
Harrington Creek							
Reach 1	0001	-0.5	-0.2	+0.3	005	A1	Varies
Reach 2	0001	-1.3	-0.3	+0.8	015	A3	
Lateral A							
Reach 1	0001	-0.7	-0.8	+0.3	005	A1	Varies
Reach 2	0001	-1.9	-1.5	+0.4	020	A4	
Lateral B							
Reach 1	0001	-0.9	-0.2	+0.5	010	A2	Varies
Lateral C							
Reach 1	0001	-1.0	-0.3	+0.3	010	A2	Varies

[1]FLOOD INSURANCE RATE MAP PANEL
[2]WEIGHTED AVERAGE
[3]ROUNDED TO NEAREST FOOT-SEE MAP

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

CITY OF BARTLETT, TN

(SHELBY CO.)

FLOOD INSURANCE ZONE DATA

HARRINGTON CREEK, LATERAL A, LATERAL B, LATERAL C

FLOODING SOURCE	PANEL[1]	ELEVATION DIFFERENCE[2] BETWEEN 1.0% (100-YEAR) FLOOD AND			FHF	ZONE	BASE FLOOD ELEVATION[3] (NGVD)
		10% (10 YR.)	2% (50 YR.)	0.2% (500 YR.)			
Lateral D							
Reach 1	0001	-0.9	-0.3	+0.5	010	A2	Varies
Lateral E							
Reach 1	0001	-2.6	-0.5	+0.7	025	A5	Varies

[1]FLOOD INSURANCE RATE MAP PANEL
[2]WEIGHTED AVERAGE
[3]ROUNDED TO NEAREST FOOT-SEE MAP

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

CITY OF BARTLETT, TN
(SHELBY CO.)

FLOOD INSURANCE ZONE DATA

LATERAL D, LATERAL E

7.0 LOCATION OF DATA

Survey, hydrologic, hydraulic, and other pertinent data used in this study can be obtained by contacting the Insurance and Mitigation Division, Federal Emergency Management Agency, 1375 Peachtree Street, N.E., Atlanta, Georgia 30309.

8.0 BIBLIOGRAPHY AND REFERENCES

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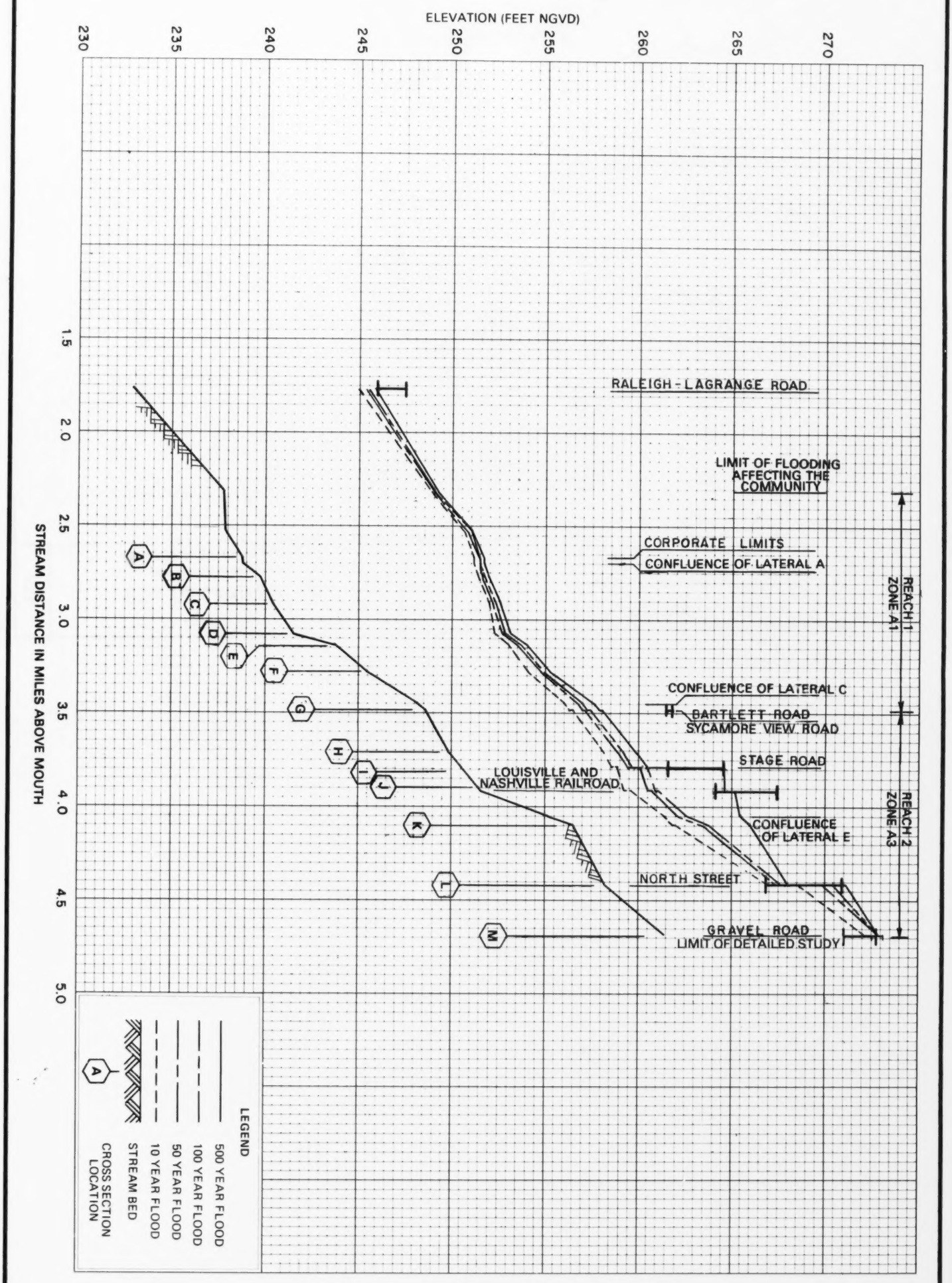
2. U.S. National Weather Service, Technical Paper No. 40, Rainfall Intensity Duration Frequency Curve, U.S. Govenment Printing Office, Washington, D.C. 1961.

3. U.S. Army, Corps of Engineers, Wolf River Basin Model Study (Underway).

4. U.S. Army, Corps of Engineers, "Computer Program HEC-2 (1973)", Davis, California.

5. U.S. Geological Survey 7.5 Minute Series Topographic Map: Northeast Memphis, Tennessee (1965), Ellendale, Tennessee (1965).

6. U.S. Department of Housing and Urban Development, Federal Insurance Administration, "Flood Hazard Boundary Maps for the City of Bartlett, Shelby County, Tennessee,' 22 February 1974, revised 3 June 1977.



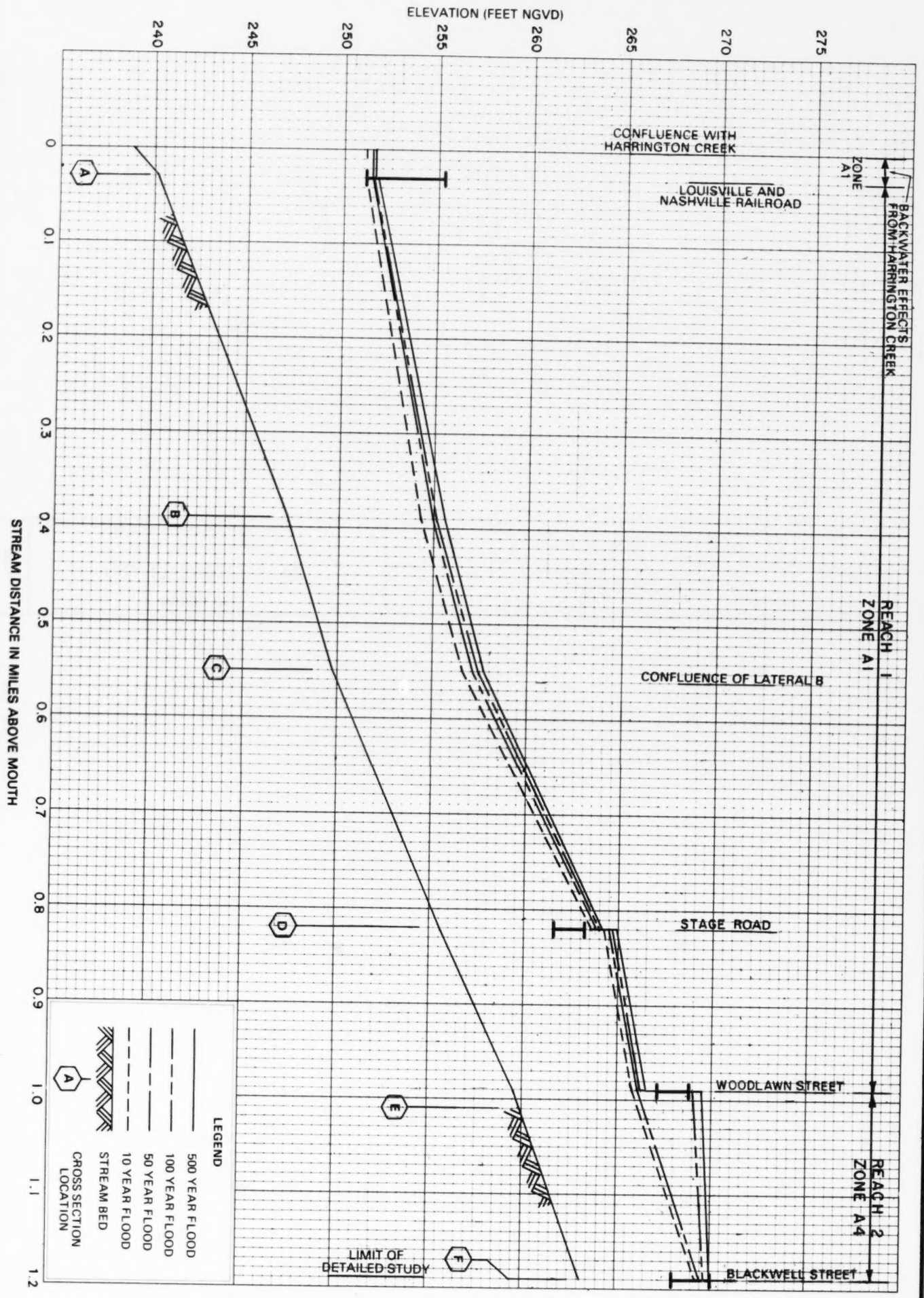
01P

FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

CITY OF BARTLETT, TN
(SHELBY CO.)

FLOOD PROFILES

HARRINGTON CREEK



02P

FEDERAL EMERGENCY MANAGEMENT AGENCY

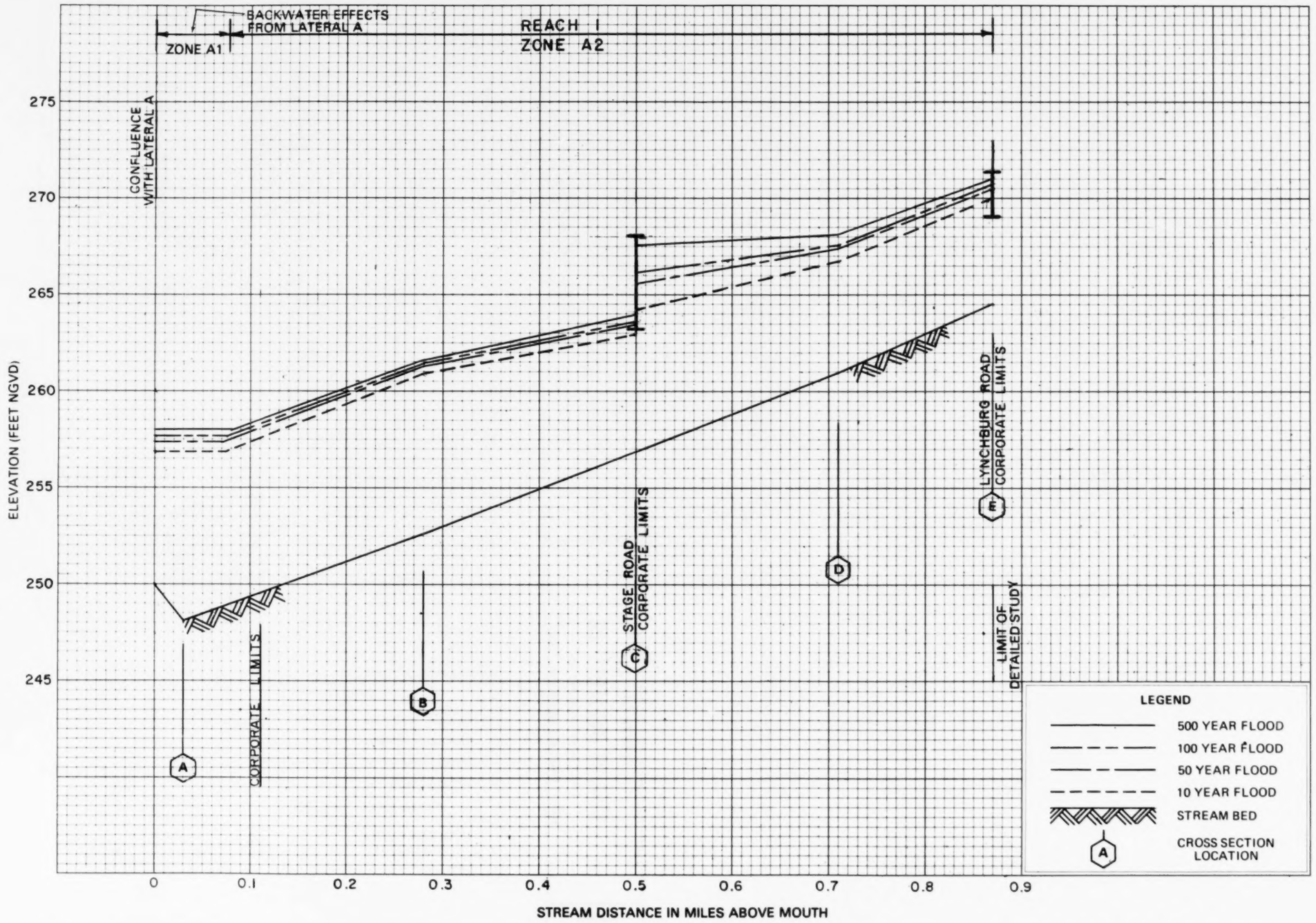
Federal Insurance Administration

CITY OF BARTLETT, TN

(SHELBY CO.)

FLOOD PROFILES

LATERAL A



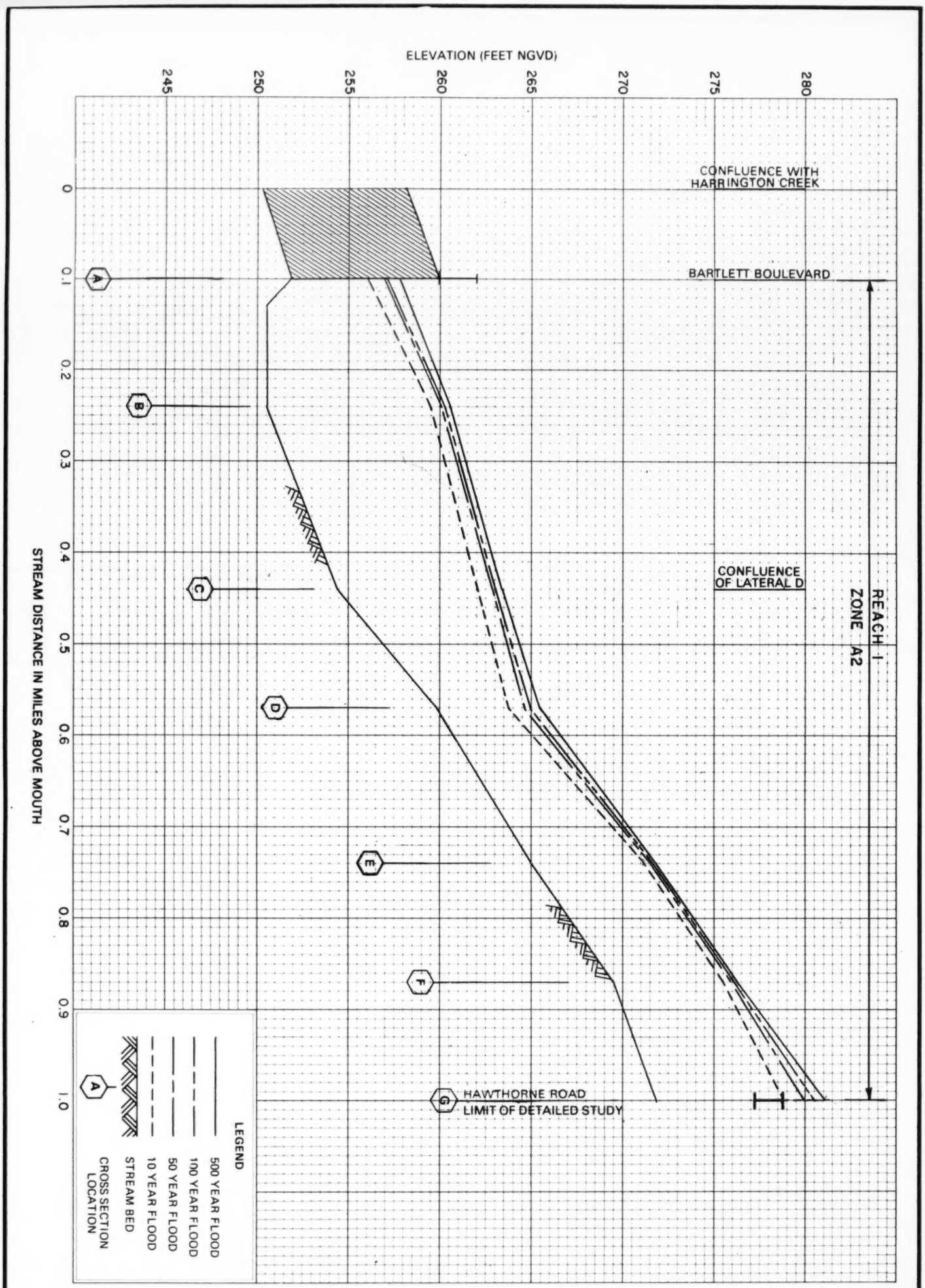
FLOOD PROFILES

LATERAL B

FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

CITY OF BARTLETT, TN
(SHELBY CO.)

03P



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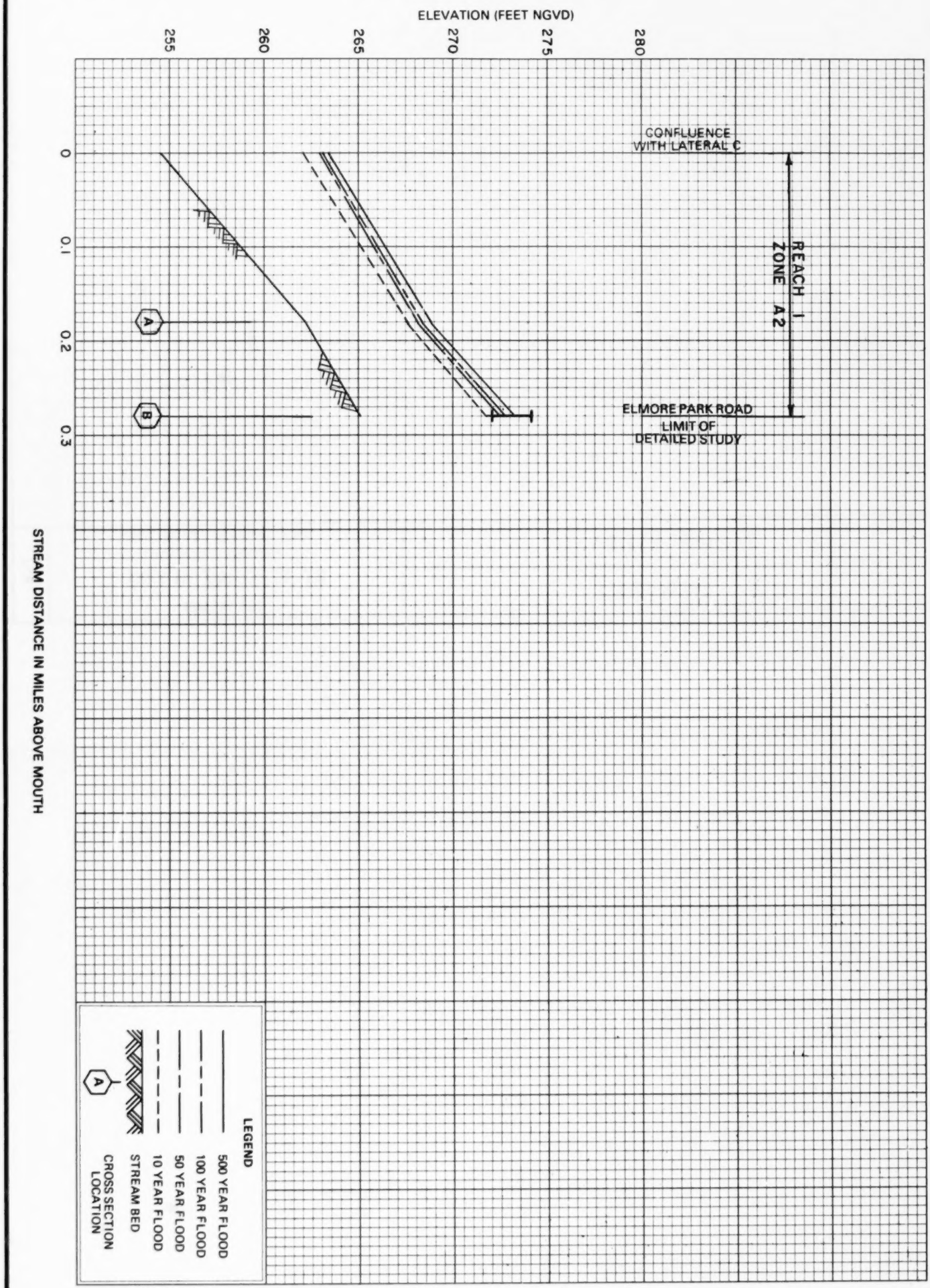
FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

CITY OF BARTLETT, TN
(SHELBY CO.)

FLOOD PROFILES

LATERAL C



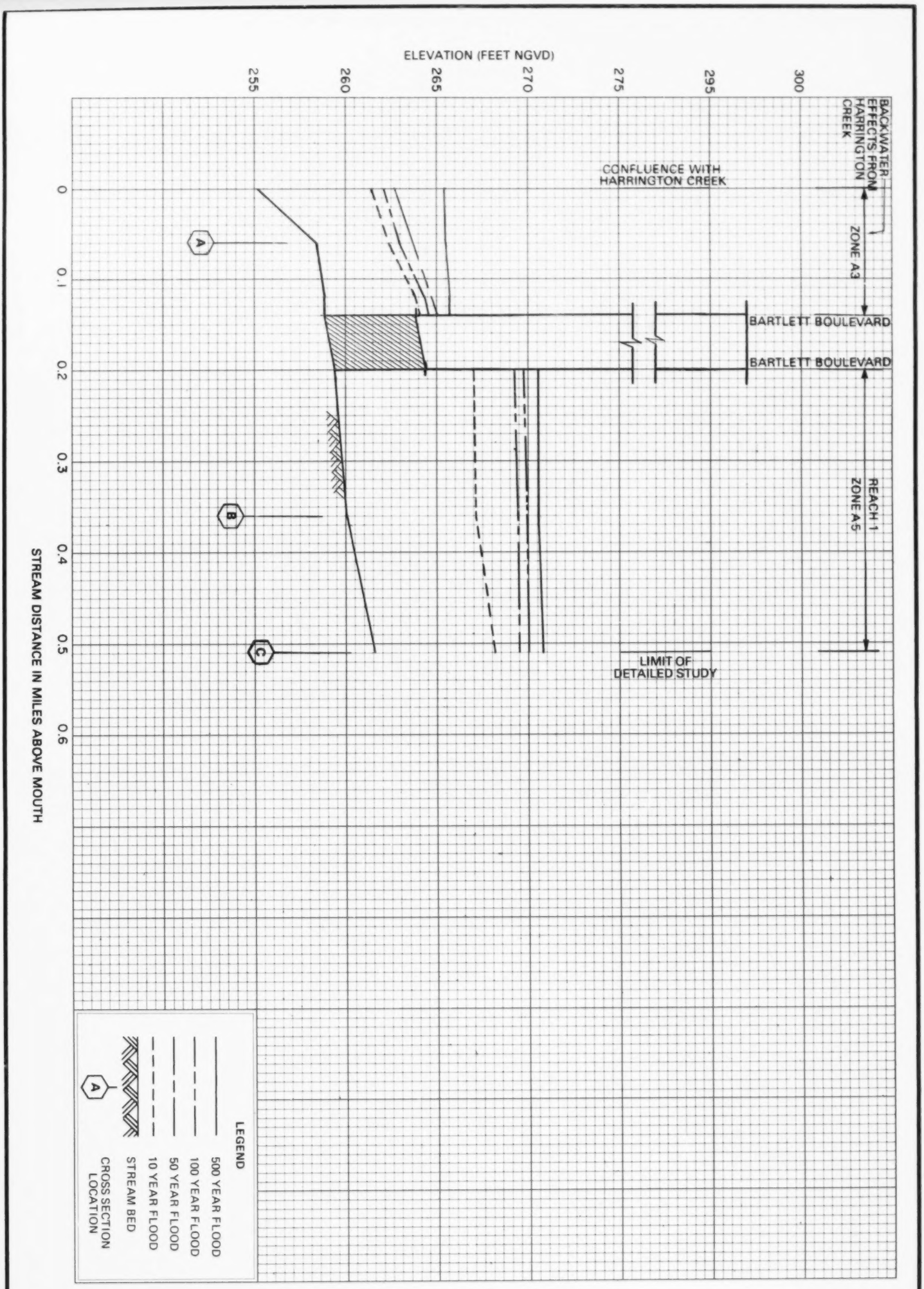
05P

FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

CITY OF BARTLETT, TN
(SHELBY CO.)

FLOOD PROFILES

LATERAL D



06P

FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

CITY OF BARTLETT, TN
(SHELBY CO.)

FLOOD PROFILES

LATERAL E